UNIVERSITI PUTRA MALAYSIA

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By

TEY YEONG SHENG

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirements for the Degree of Master of Science

July 2008

Dedication

To

My beloved parents, siblings and fiancée-Goh Bee Ling.

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirements for the degree of Master of Science

FOOD CONSUMPTION PATTERNS AND TRENDS IN MALAYSIA

By

TEY YEONG SHENG

July 2008

Chairman: Professor Mad Nasir Shamsudin, PhD

Faculty : Agriculture

Since the economic crisis in 1997, there has been notable success in Malaysian economic, where Malaysians are getting wealthier and food consumption is undergoing transitional changes. Thus, it is motivational to gain a better understanding of food consumption patterns and trends in Malaysia. This study intends to investigate food consumption patterns in Malaysia. This is followed by the analyses on the effects of socio-economic factors on food consumption and is further used to do projection for the future food consumption in Malaysia until 2020.

This study used data from the Household Expenditure Survey (HES) 2004/2005. Data from the HES was obtained from 14,084 samples in Malaysia. In order to investigate food consumption patterns in Malaysia, this study utilized the methodology of a multi-stage demand system, incorporating demographic variables to estimate income and price elasticities. In order to analyze the effects of socio-economic factors on food consumption, 36 single equations of Tobit model were

estimated. With quantity of food consumed as the dependent variable, the equations were also used to project future consumption of the 36 food items.

The estimated positive and inelastic income elasticities show that all the food items are normal goods, except for other meat. Special attention was paid to demand for rice, with positive income elasticity of 0.1325 concerning the question whether rice is an inferior good in Malaysia. While mutton (0.3196), prawn (0.3745), and processed fruits (0.3088) recorded the highest income elasticity over other food items in the food group respectively. On the other hand, own-price elasticity of each food item shows negative signs, complying with law of demand. Compensated and uncompensated own-price elasticities of rice (-0.5756 and -0.5791) were the lowest in its food group. These results indicate that rice is a necessity and still playing its role as staple food to Malaysians in 2004/2005.

The determinants of consumption of food items are found to be generally attributed to household income, urbanization, age of household's head, household size, and race. Most of the equations witnessed that gender and employment status of household's head were not significantly related to quantity of food consumed. By taking into account of socio-economic effects, overall projection results show increasing trends for future consumption of the food items, except for rice and other meats.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

CORAK DAN GAYA KEPENGGUNAAN MAKANAN DI MALAYSIA

Oleh

Tey Yeong Sheng

Julai 2008

Pengerusi : Profesor Mad Nasir Shamsudin, PhD

Fakulti : Pertanian

Semenjak krisis ekonomi yang berlaku pada tahun 1997, ekonomi Malaysia telah mencapai kejayaan dengan penduduk-penduduk yang semakin kaya dan terdapatnya perubahan peralihan dari segi kepenggunaan makanan. Oleh itu, corak dan gaya kepenggunaan makanan di Malaysia perlu dikaji dengan lebih menelam. Objektif kajian ini adalah untuk menyelidik corak kepenggunaan makanan di Malaysia. Ini diikuti oleh analisis tentang kesan faktor sosial ekonomi ke atas kepenggunaan makanan yang seterusnya akan digunakan dalam unjuran kepenggunaan makanan di Malaysia sehingga tahun 2020.

Kajian ini menggunakan data dari Kajian Perbelanjaan Isi Rumah (KPIR) bagi tahun 2004/2005. Data KPIR diperolehi daripada 14,084 sampel kajian di Malaysia. Dalam melihat corak kepenggunaan makanan di Malaysia, kajian ini menggunakan kaedah sistem permintaan pelbagai peringkat yang mengandungi penunjuk boleh ubah dalam menganggarkan pendapatan dan kelenturan harga. Dalam menganalisis kesan demografi ke atas pengambilan makanan, 36 persamaan Tobit telah

dianggarkan. Dengan jumlah makanan yang diambil sebagai pemboleh ubah tidak bersandar, persamaan ini turut digunakan dalam merancang penggunaan 36 item makanan terbabit.

Anggaran secara positif dan kenjalan pendapatan, telah menunjukkan semua item adalah normal kecuali daging yang lain. Perhatian khas telah diberikan ke atas permintaan terhadap beras di mana keanjalan pendapatan positif 0.1325 yang telah menunjukkan permintaan yang rendah di Malaysia. Manakala daging kambing (0.3196), udang (0.3745), dan buah-buahan yang diproses (0.3088) telah merekodkan kenjalan pendapatan yang tertinggi berbanding item yang lain di dalam kumpulan yang berkaitan. Dengan kata yang lain, kenjalan harga bagi setiap item makanan menunjukkan petunjuk yang negatif, mengikut hukum permintaan. Harga keanjalan bagi beras adalah yang terendah di dalam kumpulannya (-0.5756 dan -0.5791). Ini menunjukkan bahawa beras masih lagi diperlukan dan memainkan peranan yang penting sebagai makanan ruji rakyat Malaysia bagi tahun 2004/2005.

Penentuan pengambilan item makanan didapati telah menyumbang secara umumnya kepada pendapatan isi rumah, urbanisasi, usia ketua isi rumah, saiz isi rumah dan kaum. Kebanyakan daripada persamaan menyaksikan faktor jantina dan status pekerjaan ketua isi rumah tidak berkait dengan jumlah pengambilan makanan. Dengan mengambil kira kesan faktor demografi, keputusan keseluruhan unjuran menunjukkan corak peningkatan dalam pengambilan makanan bagi kesemua item makanan kecuali beras dan daging.

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I would like to express my heartfelt appreciation to my dearest parents and siblings for their spiritual encouragement. I also wish to express my special gratitude to my beloved fiancée, Goh Bee Ling who has always been my source of inspiration to achieve higher level in my life.

I certify that an Examination Committee has met on 7 July 2008 to conduct the final examination of Tey Yeong Sheng on his Master of Science thesis entitled "Food Consumption Patterns and Trends in Malaysia" in accordance with Universiti Pertanian Malaysia (Higher Degree) Act 1980 and Universiti Pertanian Malaysia (Higher Degree) Regulation 1981. The Committee recommends that the student be awarded the Master of Science.

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This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Master of Science. The members of the Supervisory Committee were as follows:

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DECLARATION

I hereby declare that this thesis is based on my original work except for quotations and citations, which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UPM or other institutions.

TEY YEONG SHENG

Date: 23 August 2008

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURE

LIST OF ABBREVIATIONS

AIDS	Almost Ideal Demand System
DAIDS	Dynamic Almost Ideal Demand System
LES	Linear Expenditure System
LA/AIDS	Linear Approximate Almost Ideal Demand System
MNL	Multinomial Logit Model
NAP3	Third National Agricultural Policy
NMNL	Nested Multinomial Logit Model
OLS	Ordinary Least Squares
QES	Quadratic Expenditure System
QUAIDS	Quadratic Almost Ideal Demand System
8MP	Eighth Malaysian Plan
9MP	Ninth Malaysian Plan

CHAPTER 1

INTRODUCTION

This chapter is divided into five sections: an overview of food consumption, problem statements, objectives, significance of this study, and organization for the other chapters.

1.1 Food Consumption in Malaysia

Food consumption trends are to illustrate the changes of per capita quantity in food consumption over time. Food consumption patterns can be studied in two ways, namely one based on the per capita quantity of food consumed and the other on demand elasticities (Schaffner *et al.*, 1998).

Changes in Malaysian food consumption have been described by Ishida *et al.* (2003) as typical of those in developing countries. When per capita income of Malaysians grew from very low levels immediately after independence, there was an increase in consumption of the basic staple (rice). Further increase in per capita income led to diversification in Malaysian diet. Per capita consumption of rice started to decline and while per capita consumption of wheat started to increase in 1970's. At the same time, the per capita consumption of the cheapest protein-rich meat, poultry started to increase from low levels. The role of rice as the main staple food and main calorie provider was offset even more significantly by a strong growth in per capita consumption of wheat during rapid economic development within 1980's-2000's. Continuous increase in per

capita consumption of poultry experienced its peak in early 1990's while stronger purchasing power has seen steady increase in per capita consumption of higher value meat product, beef.

Changes of dietary of Malaysians are also reflected in the account of exports and imports of foods in Malaysia as well. Table 1.1 shows that imports of foods totaled RM15 billion in 2005, 46% more than in 2000. Though exports of foods are increasing, the amount is rather small compared to the country's dependency on imports. Most of the high net imports cannot be produced locally, for example, cereal. However, those can be locally grown also accounted a large portion in imports.

Table 1.1: Exports and imports of food (RM million), 2000-2005

Commodity	RM million						Average Annual Growth Rate (%)	
	2000	%	2005	%	2010	%	8MP Achieved	9MP Target
Export	**5,268.6**	**100.0**	**7,986.80**	**100.0**	**15,501.0**	**100.0**	**8.7**	**14.2**
Live Animals	357.4	6.8	425.1	5.3	467.0	3.0	3.5	1.9
Meat & Meat Preparations	64.6	1.2	85.9	1.1	2,895.0	18.7	5.9	102.1
Dairy Products	410.2	7.8	413.2	5.2	520.0	3.4	0.1	4.7
Vegetables	278.4	5.3	491.6	6.2	614.0	4.0	12.0	4.5
Fruits	512.4	9.7	471.9	5.9	2,153.2	13.9	-1.6	35.5
Sugar, Sugar Preparations & Honey	353.7	6.7	492.2	6.0	474.6	3.1	6.3	-0.2
Cereal & Cereal Preparations	610.8	11.6	916.6	11.5	576.5	3.7	8.5	-8.9
Fish, Crustaceans, Molluscs & Preparations thereof	1,263.30	24.0	2,265.9	28.4	4,624.7	29.8	12.4	15.3
Feeding Stuff for Animals	375.3	7.1	547.1	6.9	531.0	3.4	7.8	-0.6
Others	1,042.50	19.8	1,890.3	23.7	2,645.0	17.1	12.6	6.9
Imports	**10,543.5**	**100.0**	**15,435.0**	**100.0**	**14,276.9**	**100.0**	**7.9**	**-1.5**
Live Animals	154.6	1.5	177.4	1.1	127.0	0.9	2.8	-6.5
Meat & Meat Preparations	771.4	7.3	1,054.6	6.8	1,262.0	8.84	6.5	3.7
Dairy Products	1,176.50	11.2	1,745.1	11.3	1,533.0	10.74	8.2	-2.6
Vegetables	1,023.60	9.7	1,620.2	10.5	670.0	4.69	9.6	-16.2
Fruits	561.6	5.3	694.9	4.5	812.1	5.69	4.4	3.2
Sugar, Sugar Preparations & Honey	1,085.20	10.3	1,406.0	9.1	1,216.0	8.52	5.3	-2.9
Cereal & Cereal Preparations	1,839.1	17.4	2,267.1	14.7	1,464.8	10.26	4.3	-8.4
Fish, Crustaceans, Molluscs & Preparations thereof	1,085.80	10.3	1,851.9	12.0	841.0	5.89	11.3	-14.6
Feeding Stuff for Animals	1,928.4	18.3	2,838.2	18.4	4,303.0	30.14	8.0	8.7
Others	917.3	8.7	1,779.6	11.5	2,048.0	14.34	14.2	2.8

Source: Ninth Malaysia Plan, 2006 - 2010.

1.2 Problem Statements

Ever since the crisis in 1997, Malaysian economic has been recovering and growing at 6% averagely. The higher per capita income, coupled with rapid urbanization process has empowered changes in lifestyle, which normally refers to better living quality. These economic and demographic changes have caused a rapid increase in demand for cereal and meat based products. Such phenomena show that as these factors change over time, the food consumption patterns change as well. For example, Ishida *et al.* (2003) obtained different estimates of expenditure elasticities for meats over time, namely 0.34 in 1973, 0.42 in 1980, and 0.27 in 1993/94.

By reviewing the current demand literatures for food in Malaysia, it is apparent that several inadequacies arise from the lack of empirical studies on updated Malaysian food consumption patterns especially after the economic crisis in 1997. Understanding the changes in food patterns probably provides one of the best bases for adding value to agri-food chain to meet the consumer needs and for appropriate policy formulation.

An obvious drawback in previous studies (Mustapha *et al.*, 1999, 2000 and 2001; Baharumshah and Mohamed, 1993; Mustapha, 1994; Radam *et al.*, 2005) on food demand in Malaysia is that they used expenditure elasticities[i] as the proxies for income elasticities. Chern (2000) suggested that it is more appropriate to convert expenditure

[i] USDA (2008) defined expenditure elasticity as a measure of the responsiveness of demand to changes in expenditure on a bundle of similar goods. The expenditure elasticity shows how the quantity purchased changes (how sensitive it is) in response to a change in the consumer's expenditure, which is a proxy for income.

elasticities into income elasticities[ii] for use in projecting future demand for food. Thus, this study is motivated to investigate the actual income elasticities rather than expenditure elasticities.

Each economic or non-economic factor has a different impact on food consumption over a lifetime. Changes in food consumption can be explained by price and income effects where others can be explained by demographic characteristics. The demographic factors such as urbanization, age and household size have been identified as other major determinants of food consumption. For example, Chern (2000) showed that the decrease in rice consumption is not due to income growth but it is because of urbanization effect, where people consume more meat than rice as they migrate from rural region to urban region. Understanding of the demographic factors that affect food consumption over time is useful to predict what and how much people consume.

As the food supply chain is increasingly market-led, the ultimate challenge is engaged in meeting current consumer wants. Past experience has shown the prevalence of supply-demand mismatch for many of the food products like fish, vegetables and fruits. Though imports are always available, the lack of an efficient marketing system and infrastructure results in slow adjustments among domestic markets that have shortfalls in supplies. In return, consumers are forced to pay more for the food product or seek substitute.

[ii] USDA (2008) defined income elasticity as a measure of the responsiveness of demand to changes in income. The income elasticity shows how the quantity purchased changes (how sensitive it is) in response to a change in the consumer's income.

Therefore, a study to project future food consumption till 2020 is essential to meet the domestic demand in Malaysia.

1.3 Objectives

The general objective of this study is to investigate food consumption patterns and trends in Malaysia. The specific objectives are:

a. To investigate food consumption patterns in Malaysia;

b. To determine the effects of demographic factors on the food consumption; and

c. To project the food consumption patterns and trends until 2020.

1.4 Significance of Study

The entire food industry is impacted by changes in food demand (Charlet and Henneberry, 2005). Farm organizations and Ministry of Agriculture officials are generally concerned with matters such as adjustments in farm production to meet changing demands, conservation, food distribution programs, the competition of imports with domestic production, and potential export markets for surpluses. An understanding of the forces shaping consumer demand is essential. As consumer behavior changes, many descriptive facts about variations in consumption become outdated, food demand analysis can improve understanding of domestic food trends by quantifying the relationship between food demand and demographic factors. This knowledge in turn can provide crucial input in assessing future food needs.

Government agencies are major users of data contrasting consumption trends and patterns in Malaysia with other countries, and relating them to international economic development. Thus, understanding the consumer behavior or the consumption patterns of a country is crucial for government in designing its own economic plan and for other countries in determining the market for their exports. Policy makers stay attuned to the structural elements of food demand to improve public policies aimed at consumer well-being.

Food marketing practitioners recognize the importance of both demographic and economic factors as they develop and market food products. Malaysians are expected to spend more on food in terms of quantities and qualities in future like other better developed countries. This can be translated into opportunities for investors in the agri-food sector. Thus, business groups take a very active interest. Indeed, they argue for special tariff treatment or trade policies that will benefit their expansion in Malaysia. Furthermore, a set of demographic variables can be used to classify households at various stages of dietary transformation. For example, knowing some of the different characteristics of households that demand for protein-rich diets can be useful in segmenting the market.